



High resolution ice thickness, bed topography, and roughness of a land terminating section of the western Greenland Ice Sheet

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TITLE: High resolution ice thickness, bed topography, and roughness of a land terminating section of the western Greenland Ice Sheet

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ABSTRACT BODY: We present ice thickness and bed topography maps with high spatial resolution (250-500 m) of a large land terminating section of the western Greenland Ice Sheet. The maps cover the Isunnguata Sermia, Russell, and Leverett outlet glaciers and their catchment areas up to an elevation of ~1,700 m above sea level. The bed topography shows an intricate subglacial trough system, resembling the landscape in the proglacial area. We also calculate the hydraulic potential to get a proxy of the subglacial routing of water in the area. To analyse the geomorphological conditions of the bed, we calculated the spectral roughness. We see a strong correlation of low roughness values with the ice flow direction; this makes it important to assess the direction of the radar profiles in relation to the flow direction when calculating effective subglacial roughness for an area. Low roughness values and high surface velocities also coincide with an overdeepened trough system in the northern parts of the area; an area where active smoothing could be taking place. The southern parts consist of high bed elevations and have generally high roughness values; the bedrock likely consists of hard unreworked orthogneiss. There is strong evidence that the subglacial troughs have a preglacial origin, since they are aligned with geological weakness zones in the proglacial area and several lineaments can be traced for long distances underneath the ice sheet.

KEYWORDS: 0726 CRYOSPHERE Ice sheets, 0776 CRYOSPHERE Glaciology, 0758 CRYOSPHERE Remote sensing.

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